

Informal Regulatory Analysis
Of
Amendment to Chapter 61, "Water Quality Standards"
Nutrient Water Quality Standards for Lakes to Support Recreational Uses

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I. Background

The Department of Natural Resources (Department) has proposed an amendment to Chapter 61 of the Iowa Administrative Code, Title 567. The proposed amendment is to establish Nutrient Water Quality Standards for Lakes to Support Recreational Uses and was approved by the Environmental Protection Commission at its January 18, 2011 meeting. The Notice of Intended Action was published on February 23, 2011 in the Iowa Administrative Bulletin as **ARC 9371B**.

Water Quality Standards are the goals that Iowans expect rivers, streams and lakes to achieve. These standards establish selected criteria for certain present and future designated uses of the surface waters of the state. The standards establish the areas where these uses are to be protected and provide minimum criteria for waterways having nondesignated uses as well. The Clean Water Act (40 CFR 131.10(a)) states that each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation.

The purpose of the proposed rule is to establish a water quality standard to protect swimming in certain lakes in Iowa. The concerns affecting the swimming recreational use goal are suspended solids, primarily from erosion, and excess nutrients. The nutrients reach waterbodies from a variety of sources which include point sources, such as effluent from a wastewater treatment plant and non-point sources such as fertilizer runoff from fields and lawns, manure runoff from livestock operations, or the erosion of nutrient rich soils. When these nutrients reach excessive concentrations, they can have severe detrimental effects that can be both aesthetic and cause safety concerns.

Nutrients create a biological response that can increase the amount of algae present in the water column, and when nutrients are present in excess amounts, they can produce what is commonly referred to as algal blooms. These blooms can produce unpleasant odors, decrease clarity that creates dangerous recreational conditions by hiding hazards in the water, and generate toxins that can affect both terrestrial and aquatic life. As the algae dies off, the decomposition process utilizes oxygen, leading to oxygen deficiencies in the waterbody that affect aquatic life.

These conditions do not occur only locally, but can have serious effects throughout the entire water system. Nutrient loads from Iowa travel down the stream and river networks, in and out of lakes, and continue downstream combining with nutrients from other states and stream systems as they converge all the way to the Gulf of Mexico. This concentration of nutrients continues to promote algae growth and is the primary cause for the hypoxic zone in the Northern Gulf of Mexico. Dissolved oxygen levels in this zone are so low that it is almost uninhabitable for aquatic life.

Nutrients are a major issue that has federal, state and local governments nationwide planning and implementing programs to reduce nutrients in our waterways. The immediate concern for the Department is to protect the people of Iowa and reduce the health and safety concerns of those who utilize the state's swimming lakes.

To address this issue, the Department appointed Mike Burkhart, a professor at Iowa State University, to head a science advisory panel to research nutrients and their effects on swimming in Iowa lakes. In February 2008 the Nutrient Science Advisors (NSA) completed their recommendations for criteria for recreational uses in lakes. The report can be found on the Department's web site: <http://www.iowadnr.gov/InsideDNR/RegulatoryWater/WaterQualityStandards/Nutrients.aspx>. The Department has developed draft criteria necessary to support swimming based on the recommendations in the NSA report.

The NSA recommended setting two criteria that are necessary to support swimming: Secchi disk depth of one meter or greater and chlorophyll-a of no higher than 25 micrograms per liter (ug/l). Both of these are measures of the transparency of the water. A Secchi disk is a black and white disk developed to accurately and precisely measure how far light penetrates into the water. The disk is lowered into the water on a rope and the depth at which the disk disappears is recorded. Chlorophyll-a is the pigment in algae that can make the water appear green in the summer. The clarity of the water is important for swimmers so underwater hazards can be avoided. Studies show that people are more likely to swim in lakes where the water is clearer than where it is turbid or green.

To address seasonal variability within any given lake, the Secchi disk and chlorophyll-a criteria must be met in 75% of samples with a minimum of 9 samples collected. At least 3 of the 9 samples must be taken from the deepest part of the lake, with all 9 samples taken within a 5 year period in order to make a determination on whether the lake is currently meeting the water quality standard. Those samples must be collected between the months of May through September with a minimum of 3 samples collected during any one summer season.

In addition to the clarity criteria discussed above, the NSA report also recommended establishing criteria for total phosphorus of 35 ug/l and total nitrogen of 900 ug/l. Criteria for total phosphorus and total nitrogen are not included in this rule because the Department's analysis of the data shows that the correlation between total phosphorus and water clarity is not strong enough to warrant setting a standard that would apply to lakes across the state. Studies have shown that a stronger relationship between total phosphorus and water clarity can be drawn when studying a single lake but the relationship breaks down when data from multiple lakes is examined. A total nitrogen standard was not included in this rule due to the relationship between total nitrogen and water clarity being weaker than the relationship between total phosphorus and water clarity.

The list of lakes to which these criteria will apply was developed after reviewing a comprehensive list of Iowa lakes on an individual basis. The criteria used to select lakes are discussed below. A complete list of lakes reviewed for inclusion can be found on the Department's web site here: <http://www.iowadnr.gov/InsideDNR/RegulatoryWater/WaterQualityStandards/Nutrients.aspx>.

A lake was added to the list if it 1) had a maintained beach 2) appeared on the list of Significant Public Owned Lakes (SPOL) or 3) has a mean depth of more than three meters (9.9 feet). Lakes with a very large drainage area to surface area (DA:SA) ratio, lakes where swimming is prohibited, and privately

owned lakes were omitted from the list. More details on these criteria are discussed below. This analysis resulted in the 159 lakes listed under this rule, which can be found in Appendix A.

Criteria Details:

Beaches: All lakes with a maintained swimming beach (except impoundments with large DA:SA ratios) are included in this list. The nutrient standard is intended to determine if the water quality in a lake can fully support recreational uses and any lake that encourages swimming should be included regardless of mean depth or if it is an SPOL or not.

SPOL: All lakes considered to be a Significant Publically Owned Lake (except lakes where swimming is prohibited) are included on this list. The definition of a SPOL was created in 1980 by the Department and Iowa State University as a method to prioritize lakes for restoration. These lakes are defined as those lakes which are maintained principally for public use; are capable of supporting fish stocks of at least 200 pounds per acre; have a surface water area of at least 10 acres; have a watershed to lake surface area ratio of less than 200:1; are not shallow marsh-like lakes, federal flood control impoundments, or used solely as water supply reservoirs. It was decided that if the lakes met the criteria to be a SPOL then it should be included on the list of lakes to which the recreational use standard apply.

Mean Depth: All lakes with a mean depth of three meters (9.9 feet) or greater (except impoundments with large DA:SA ratios or lakes where swimming is prohibited) are included on this list. A technical review was conducted by the Department using available monitoring data to determine which lake characteristics drive a lake's ability to manage nutrients. Average depth was found to be a primary factor with the 3 meter depth being statistically significant. This goes along with the concept that deeper lakes may have a higher probability to attract swimming uses.

DA:SA Ratio: Reservoirs and on-stream impoundments with a large drainage area to surface area ratio (DA:SA ratio) have high flow-through rates and are considered to be more of a river than a lake and should not be included in nutrient standards intended for lakes (e.g., Saylorville Reservoir has a DA:SA ratio of 637:1 at conservation pool). These water bodies were removed from the list regardless if they had beaches, met the depth requirement, or considered an SPOL.

Swimming Prohibited: Swimming is prohibited in certain lakes in Iowa including some wildlife refuges (e.g., DeSoto Bend) or drinking water supplies (e.g., Dale Moffitt Reservoir). These lakes were removed from the list regardless if they met the SPOL or depth criteria. It was decided that a nutrient criteria focused on swimming should not be applied to lakes that do not allow such uses.

Privately Owned Lakes: Lakes that do not allow for public access are excluded from the list (e.g., Lake Panorama).

If one of the lakes listed in this rule does not meet the criteria then it is considered "impaired" and will be placed on Iowa's Section 303(d) Impaired Waters List. This list is compiled in even numbered years; therefore, these lakes will most likely not be evaluated for impairment until the drafting of the 2014 listing due to the 2012 listing being nearly complete by the anticipated date of this rule being finalized.

In 2000, the Department began an ambient lake monitoring program that collects water quality data from 131 lakes statewide. Of those 131 lakes, there are 121 that are included under this rule. Those lakes will have the appropriate monitoring data available to make an impairment determination to be included in the 2014 listing. The other 38 lakes will be evaluated if adequate monitoring data becomes available in the future.

Within 13 years of being listed as impaired, a Total Maximum Daily Load (TMDL) must be calculated for each impairment. The TMDL will determine the causes and sources of each impairment and assign a load value to each source. Point sources contributing to the impairment can be regulated through their NPDES permit and may be required to remove nutrients from their effluent. Non-point sources are primarily addressed through watershed groups and voluntary programs where landowners get involved to implement land practices that reduce nutrient runoff and erosion.

Currently, lakes in Iowa can be impaired for nutrients based on the narrative language in the general water quality criteria section (61.3(2)) in Chapter 61 of the Water Quality Standards. That narrative states that surface waters including general use and designated use waters shall be free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor or other aesthetically objectionable conditions.

Prior to the 2000 ambient lake monitoring program, the violation of this standard was based primarily on the best professional judgment of the Department's fisheries biologists. As more comprehensive monitoring data became available after the start of the lake monitoring program, the Department incorporated using Carlson's (1977) trophic state index (TSI) to identify lakes that may not be meeting the narrative criteria. The index is an indicator of algal biomass suspended in lakes and thus reflects a lake's nutrient condition and water transparency. Lakes that did not meet the expectations of this method were then corroborated by the Department's field staff before being considered for impairment. This rule adds clarity to the methods currently used by implementing the numeric criteria for Secchi depth and chlorophyll-a.

This rule is part of a wider effort to define how clean Iowa's lakes and streams should be when it comes to excess nutrients. The Department is also looking at nutrients in two other major projects:

The Department has contracted with Iowa State University to develop an Index of Biotic Integrity (IBI) for lakes that will describe numerically what a healthy lake ecosystem looks like. Lakes that have IBI scores below this threshold will be considered impaired and corrective action will be necessary under the Clean Water Act. The University has completed the field work on this project and the final report is expected in December 2012.

For over 10 years, the Department has been collecting data from smaller streams (referred to as “wadeable streams”) to determine what a healthy stream looks like. In the spring of 2010, the Department convened an advisory panel of stream experts to look at this data to see if a strong relationship exists between the health of the stream ecosystem and the nutrient levels in the stream. If a strong relationship exists, the data can be used to determine the maximum concentration of nutrients in the stream that still allow for a healthy stream.

The Administrative Rules Review Committee reviewed the proposed amendments during its meeting on March 14, 2011. At that time, the committee voted to direct the Department to complete an informal regulatory analysis of the proposed rules, in compliance with Iowa Code section 17A.4A, subsection 2, paragraph "a." The elements to be included in the analysis are specifically identified as follows:

- A. A description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.
- B. A description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon affected classes of persons, including a description of the nature and amount of all of the different kinds of costs that would be incurred in complying with the proposed rule.
- C. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.
- D. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.
- E. A determination of whether less costly methods or less intrusive methods exist for achieving the purpose of the proposed rule.
- F. A description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the agency and the reasons why they were rejected in favor of the proposed rule.

Each of these elements will be addressed in turn. In addition, the following concerns were conveyed by the ARRC during the meeting on March 14, 2011 and will be addressed within part "A" of the analysis:

- Will this rule cause beach closings?
- Will an impairment determination be an impediment to economic development near the lake?
- Will the voluntary programs designed to improve water quality become mandatory if a lake is impaired?

II. Elements of the Analysis

- A. A description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.**

Classes of persons who probably will be affected by the proposed rule would be any entity that has a NPDES permit, has phosphorus or nitrogen in their effluent, and discharges to a lake determined to be impaired under this rule. This impact will be fairly low considering discharges of pollutants to state-owned lakes are prohibited by state law (455B.186(1)) but there are a few permits for discharges to creeks above lakes and some for discharges to lakes that are not state-owned.

There are 17 permitted facilities that have discharge permits and some sort of treatment in place within the watersheds of 11 of the lakes listed under this rule. 10 out of the 11 lakes, affecting 16 of the facilities, may be considered impaired under this rule based on current monitoring data; however, 6 of those lakes, affecting 11 facilities, are already considered impaired for nutrient related reasons based on the aesthetically objectionable approach. Therefore, this rule may have no additional affect on those facilities.

The list of lakes that will ultimately be listed as impaired based on this standard is uncertain when considering that these lakes will most likely not be evaluated for impairment until the drafting of the 2014 303(d) Impaired Waters listing. Monitoring data that has yet to be collected will be included in determining if the lakes meet the new water quality standard. (Facility and lake information can be found in Appendix B).

According to research conducted by the Department, most (85-90%) of the nutrients in a typical Iowa waterbody come off the watershed rather than through point sources that require a discharge permit. In light of this fact, the TMDLs that have been written for nutrient impairments have assigned a maximum load to city wastewater treatment plants equal to what the plants currently discharge or to what the plants are designed to discharge. For example, Pilot Mound, Solon, Macbride SD & Terril are wastewater treatment facilities that are currently under approved nutrient TMDLs. Each of these facilities was assigned a wasteload allocation estimated to be equivalent to their existing discharge during the time the TMDL was developed. This means that these plants will not have to add treatment or remove nutrients to meet the goals of the TMDL unless they plan to increase the amount of nutrients discharged sometime in the future. This approach may continue, but that will not be determined until the TMDL is written.

An impairment determination will likely have very minimal negative effects on economic development. It is already illegal to discharge to most of these lakes; therefore, a new business or industry that would need a permitted discharge is already prohibited from discharging into many of these lakes, and it will have no regulatory effect on agricultural activities in the watershed.

This rule is designed to protect swimming in lakes; however, if a lake is determined to be impaired, that does not mean the beaches will be closed at that lake. There is no regulation of beaches within this rule and that discretion will be left up to the lake managers. This is a long term standard needing 3 years of data to determine if the lake meets it or not which makes it an impractical tool for issuing beach advisories. The Department began monitoring beaches for bacteria in 1999 through Iowa's Beach Water Monitoring Program. This program has expanded over the years to include all state park beaches and

many locally managed beaches in Iowa. This monitoring program will continue and the Department will administer advisories and closings based on that program.

Classes of persons that will benefit from the proposed rule include all users of the lakes listed under this rule. The proposed rule will better preserve Iowa's swimming lakes for future generations. Local economies may also benefit in the future from the increased visitors that improved water quality will attract. A study was conducted by the Center for Agriculture and Rural Development (CARD) at Iowa State University comparing lake use and the resulting economic benefit to water quality.

Researchers at CARD sent out a survey in 2002 asking questions related to the frequency of visits to lakes and which factors led to their lake selection. After compiling and analyzing the data, their findings were put into a report titled "Recreation Demand Using Physical Measures of Water Quality," in 2004. The researchers determined that respondents strongly value water quality and are willing to travel further for it. Excessive algal growth was identified as a limiting factor and lakes exhibiting those conditions received fewer visitor trips. On the other hand, it appears that just being on the 303(d) Impaired Waters List had little effect on the visitor's chosen destination in comparison to their perception of the water quality at the time of their visit. For example, Clear Lake was 4th and Big Creek was the 5th most visited lake for day trips even though both lakes were on the Impaired Waters List for nutrient impairments at the time the survey was sent out.

CARD continued the survey each year between 2002 and 2005 to gather a baseline of usage, and then again in 2009 to evaluate how usage had changed from the baseline. Their findings were just released in May 2011. The report shows that in 2009 there were 11,977,623 household trips to Iowa lakes, which is a 26.6% increase in visitation rates from the 2002 through 2005 average, spending a total of \$1.6 billion annually during their visits.

The rule will also benefit lake managers of the lakes considered impaired. If it is determined that a lake is impaired under this rule and a subsequent TMDL is completed, it will identify the sources needing improvement to meet the water quality standards. This understanding will help in the planning process for the voluntary programs needed to achieve the water quality goals of the watershed.

The voluntary programs are designed to partner with local landowners that are in the affected area to work together to meet the water quality goals of the watershed. As mentioned above, this rule will affect only those voluntary programs by providing more information for planning purposes. It will have no affect on those program processes or mechanisms. They will remain voluntary and are an important part of the watershed improvement process. State and Federal laws do not regulate non-point sources of sediment or nutrients and cannot require landowners to be involved or participate in these voluntary programs. Unless Iowa imposes a regulatory framework upon non-point sources of water pollution, there is no mechanism available for the imposition of these programs.

B. A description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon affected classes of persons, including a description of the nature and amount of all of the different kinds of costs that would be incurred in complying with the proposed rule.

This rule has the potential to affect any, or none, of the 17 facilities that have a current NPDES permit within the watershed of any of the listed lakes. It will be at least 2 years before a lake is evaluated to determine if it is impaired as defined in this rule. If a lake is impaired, then a TMDL must be written within a 13 year period of the impaired listing date, to identify the causes and sources of the impairment before a nutrient load can be assigned to the facility. This means that it may be 2 to 15 years before a facility sees an impact, if any, as a result of this proposed water quality standard not being achieved.

Some of these facilities may not discharge nutrients or may upgrade in that timeframe based on other standards, growth, or an outdated system. For example, on average, a treatment facility has an operational life span of 20 to 25 years. Of the 17 facilities that could potentially be affected, 7 are currently older than 25 years, and another 4 will be older than 25 years within the next decade. Therefore, this rule could have a direct impact to just a few, or all of the facilities, depending on their current effluent, if the lake is ever impaired, if the community is growing and requires larger facilities, facility technology at the time the TMDL is completed, and whether or not the TMDL contains extra capacity for point source growth (this alone could negate any point source impact for an extended period of time).

A facility may not be required to upgrade to meet the requirements in a TMDL but may be required to monitor, or monitor more frequently, for nitrogen and phosphorus if the TMDL assigns the facility a limit for those parameters. A controlled discharge lagoon (CDL) would be required to monitor for nitrogen and phosphorus at each of their 2 annual draw down events. The current lab fees to run those tests are \$72 combined for a total annual monitoring cost of \$142 (plus shipping fees) for each CDL. The majority of continuously discharging facilities already has some sort of nutrient monitoring requirement in place (typically on a quarterly basis) but may be required to monitor more frequently (e.g., monthly). This would require an additional 8 monitoring events for a total annual increase of \$576 (plus shipping fees) to monitor for nutrients.

There may also be voluntary costs incurred by landowners within the watersheds of lakes listed as impaired. The biggest variable relating to the cost is whether the landowner chooses to be involved in the improvement projects. These programs are voluntary, so a landowner may simply choose not to participate. If they do participate, then total costs associated with the project will vary based on the scope and scale of the project. These costs could be related to land improvement, or in-lake treatment such as dredging, fish renovation, or water control structures. There are also cost-share programs in place to help offset the costs incurred by landowners willing to participate in the improvement projects.

Those improvement projects can provide economic increases in the surrounding areas. The 2011 CARD report of the 2009 survey found that 3 of the 4 lakes which experienced the largest increases in visitor

trips between the 2002 through 2005 baseline surveys and the 2009 survey had undergone major restoration efforts, with 2 of those lakes (Clear Lake and Storm Lake) exhibiting substantial water quality improvements. Clear Lake had an increase of over 115,000 visitor trips when compared to the 2002 through 2005 average which translates to a direct spending increase of more than \$15 million annually, supporting an additional 190 jobs. Storm Lake had an increase of nearly 100,000 visitor trips, with a direct spending increase of just under \$13 million, supporting more than an additional 150 jobs.

C. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.

Implementation of this rule will add to the Department's workload of calculating TMDLs. The cost to develop a TMDL varies greatly with the size of the waterbody and the number of parameters that must be sampled for to determine causes. Costs can be estimated, but again, the number of variables present creates a large potential cost range. Also, the estimated costs are not "in addition" to the current TMDL program operating costs. The TMDL program operates on a set budget, funded with EPA Section 319 funds, and the costs are an estimation of how much of that budget will be spent completing the TMDL's required as a result of this rule.

If current monitoring data is used as a reference, then there are 106 of the 159 lakes that will be considered impaired by this rule. Of those 106 lakes, there are 58 listed on the 2010 303(d) Impaired Waters List (approved by EPA on June 22, 2011) and 48 lakes that are not listed as impaired based on current water quality standards. The 58 impaired lakes are listed for various impairments such as bacteria, turbidity, and algae. A TMDL is already required for those 58 lakes. That TMDL may address an impairment issued as a result of this rule depending on the current cause of impairment, meaning an additional TMDL may not be required for those lakes. This leaves a range between 48 and 106 lakes that may require a TMDL. The TMDL program has an annual budget of approximately \$750,000 and has traditionally completed 10 to 20 TMDL's annually. Therefore, the extra nutrient TMDL's (48 to 106) would be 2.5 to 10.5 years of workload, or \$1.875 to \$7.875 million.

This rule does not require that the listed lakes develop a monitoring program, or be monitored, and the monitoring programs currently in place collect the appropriate data to evaluate those lakes for this water quality standard. Monitoring costs associated with the completion of a TMDL is included in the above estimation; therefore, no additional water monitoring costs were added.

The Lake Restoration Program focuses on restoring impaired lakes in Iowa and identifies priority lakes based on water quality assessments, technical feasibility of restoration, potential economic benefits, use by Iowans, and local support. There are 35 priority lakes across the state that have been identified for restoration projects. The 2010/2011 Lake Restoration Program annual report indicates an overall projected cost for restoring those priority lakes as \$265 million (\$75M for watershed improvements and \$190M for in-lake improvements). Those lakes have been, and future lakes will be selected based on

factors outside of this rule. Therefore, this rule will have a fiscally neutral impact on this restoration program.

Cost share funding for the installation of best management practices can be made available to landowners in the watershed. The Department can utilize EPA Section 319 funds for watershed improvement projects involving impaired waters. Other sources of funds are available at both the state and federal level for watershed and lake restoration. The overall cost to the Department associated with any lake restoration is variable without first determining the extent of the restoration plan and any additional funding availability.

D. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.

The benefits of the proposed rule include protecting these lakes for future use, having a better understanding of and creating improvement plans for the lakes considered impaired, providing safer swimming conditions for visitors to these lakes, and the economic benefits of potential increased visitor trips to improved lakes.

The costs of the proposed rule include the added workload for the Department's TMDL program, the potential nutrient removal cost to the regulated water treatment facilities within the watersheds of impaired lakes, the potential land improvement costs associated with any of the voluntary programs, and the potential lake restoration costs.

Benefits of inaction include a standard workload for the Department's TMDL program, no additional regulation for the water treatment facilities within the watersheds of the listed lakes, and no additional lakes being considered impaired.

The costs of inaction include the continued lack of a clear and concise standard to protect swimmers recreating in the lakes listed under this rule and the threat of the US Environmental Protection Agency (EPA) adopting nutrient water quality standards for the state. The EPA has made it clear that states, especially in the Midwest, need to be making efforts to address excessive nutrients. The message is that if states are unable or unwilling to begin to address the issue, then it leaves EPA with few implementation alternatives to pursue. The EPA has the authority under the Clean Water Act to adopt water quality standards for a state under certain circumstances. Although EPA has not determined that Iowa must adopt these standards, it recently determined that the State of Florida must adopt numeric nutrient standards (including criteria similar to these) or the EPA will establish criteria for the state. The only alternative to setting these criteria in rule is to let EPA develop criteria for the state. If EPA were to set these criteria, Iowa and its citizens would have minimal involvement in setting the criteria and there would be significant legal costs due to inevitable litigation resulting from that type of action as experienced in Florida. This rule making effort represents a positive step to help address nutrient

pollution in Iowa and will demonstrate to the EPA that Iowa is serious about addressing nutrient concerns of the region.

E. A determination of whether less costly methods or less intrusive methods exist for achieving the purpose of the proposed rule.

The purpose of the rule is to protect swimming in lakes by setting clarity and chlorophyll standards. The majority of the impact from this rule is placed on the Department with little mandatory impact placed on the citizens of Iowa. The rule allows for the use of current monitoring data to determine if a lake is meeting the criteria without mandating additional water quality monitoring. If a lake does not meet the clarity or chlorophyll criteria, then the lake is considered impaired and the Department is required to write a TMDL which identifies the impairment sources and provides a plan to remedy the impairment. The cost of a TMDL varies based on watershed size and complexity and has to meet specifications required by EPA, and therefore not very cost adjustable. Point sources within an impaired lake's watershed may be required to install nutrient removal based on a TMDL's recommendations and that impact could be seen in anywhere from a 2 to 15 year span depending on the completion date of the TMDL. Non-point sources are not regulated and any financial impact seen by those will be voluntary.

The non-adjustable costs (TMDL's) associated with this rule are mandated by the Clean Water Act, and the adjustable costs (facility improvements, land improvement projects, lake restoration) are so variable that specific costs are not available until a TMDL determining the cause of the impairment is completed.

The Department believes that the rule in its current form is most appropriate for achieving the set goals, while at the same time minimizing the financial and regulatory burden felt by the public.

F. A description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the agency and the reasons why they were rejected in favor of the proposed rule.

The NSA also recommended having numeric phosphorus and nitrogen criteria within this rule. These two nutrients are the primary reason for increased algal growth that decreases clarity and increases health concerns; however, the correlation between phosphorus and nitrogen levels and their effects on water clarity varies too greatly depending on lake basin and watershed characteristics to be able to select numeric nutrient criteria that would be appropriate for all lakes. The lack of clarity can also be caused by suspended solids that would not be addressed by having just phosphorus and nitrogen limits. The clarity and chlorophyll standards that are proposed are numeric limits that define the overall goal and the desired outcome without setting numeric limits for nutrients that may or may not achieve these goals for any particular waterbody.

The NSA also recommended these criteria apply to all lakes having an A1 Primary Contact Use designation. After reviewing the lakes designated as A1, it was discovered that the criteria used to determine that use may not have been consistent with what this rule is designed to protect. For

example, there are 6 wetlands with an A1 designation that would be primarily utilized for hunting or wildlife viewing, and conversely, there are 15 lakes that have maintained beaches that are not designated as A1. Ultimately, it was decided that selecting certain criteria that have a high probability of attracting swimming uses (depth, SPOL, beach) was more appropriate for the intended purpose than utilizing the A1 designation.

The initial version of this rule, approved by the EPC on November 17, 2009 and terminated on the Department's request by the EPC on March 16, 2010, included only lakes with an average (mean) depth of 3 meters or greater. The decision to include lakes based on this criterion originated from a Departmental review and data analysis that sought to determine some of the key lake and watershed characteristics that influence water quality conditions. Lake mean depth was determined to be one of the primary factors affecting water clarity and algal biomass levels. Mean depth of 3 meters represented a significant breakpoint at which lakes of equal or greater depth were more likely to have clear water and less algae growth than shallower lakes. This finding supports a general belief that deeper lakes are more likely to attract swimmers. Water quality advocates, however, raised concerns that shallow lakes that encourage swimming (have a maintained beach) or have a high probability to draw visitors (i.e., SPOL) need the same criteria as deep lakes in order to fully support recreational uses. These concerns were supported by the Department and also supported by public comments. Consequently, the initial rule proposal was retracted, and the list of lakes covered by the current version was expanded to include any lake with a beach or a lake considered as an SPOL.

Appendix A - Included Lakes

Lake Name	County Name
Airport Lake	Chickasaw
Arbor Lake	Poweshiek
Arrowhead Lake	Sac
Arrowhead Pond	Pottawattamie
Ashton Park Pond	Osceola
Avenue of the Saints Pond	Bremer
Badger Creek Lake	Madison
Badger Lake	Webster
Beaver Lake	Dallas
Beeds Lake	Franklin
Big Creek Lake	Polk
Big Hollow Lake	Des Moines
Big Sioux	Sioux
Big Spirit Lake	Dickinson
Binder Lake	Adams
Black Hawk Lake	Sac
Blue Heron Lake (Raccoon River Park)	Polk
Blue Lake	Monona
Blue Pit	Cerro Gordo
Bluebill Lake	Cerro Gordo
Bob White Lake	Wayne
Briggs Woods Lake	Hamilton
Browns Lake	Woodbury
Brushy Creek Lake	Webster
Carter Lake	Pottawattamie
Casey Lake (aka Hickory Hills Lake)	Tama
Center Lake	Dickinson
Central Park Lake	Jones
Clear Lake	Cerro Gordo
Cold Springs Lake	Cass
Crawford Creek Impoundment	Ida
Crystal Lake	Hancock
Dog Creek (Lake)	O'Brien
Don Williams Lake	Boone
Douma Area Pond	O'Brien
East Lake (Osceola)	Clarke
East Okoboji Lake	Dickinson
Easter Lake	Polk
Eldred Sherwood Lake	Hancock
Fairfield Municipal Reservoir #1	Jefferson

Lake Name	County Name
George Wyth Lake	Black Hawk
Grays Lake	Polk
Green Belt Lake	Black Hawk
Green Castle Lake	Marshall
Green Valley Lake	Union
Gustafson Lake	Buena Vista
Hannen Lake	Benton
Hawthorn Lake (aka Barnes City Lake)	Mahaska
Hickory Grove Lake	Story
Hillview R.A. Pond	Plymouth
Indian Lake	Van Buren
Ingham Lake	Emmet
Iowa Lake	Iowa
Kent Park Lake	Johnson
Kuennen's Pit W.A. (north)	Worth
Kuennen's Pit W.A. (south)	Worth
Lacey Keosauqua Park Lake	Van Buren
Lake Ahquabi	Warren
Lake Anita	Cass
Lake Belva Deer	Keokuk
Lake Catherine	Winnebago
Lake Cornelia	Wright
Lake Darling	Washington
Lake Geode	Henry
Lake Hendricks	Howard
Lake Icaria	Adams
Lake Keomah	Mahaska
Lake Macbride	Johnson
Lake Manawa	Pottawattamie
Lake Meyer	Winneshiek
Lake Miami	Monroe
Lake of the Hills	Scott
Lake of Three Fires	Taylor
Lake Pahoja	Lyon
Lake Smith	Kossuth
Lake Sugema	Van Buren
Lake Wapello	Davis
Little River Watershed Lake	Decatur
Little Sioux Park Lake	Woodbury
Little Spirit Lake	Dickinson

Lake Name	County Name
Fairview Area Impoundment	Sioux
Five Island Lake	Palo Alto
Lost Island Lake	Palo Alto
Lower Gar Lake	Dickinson
Lower Pine Lake	Hardin
Lower Sabula Lake	Jackson
Malone Park Pond	Clinton
Manteno Park Pond	Shelby
Marathon City Park Pond	Buena Vista
Mariposa Lake	Jasper
McPaul B Pond	Fremont
Meadow Lake	Adair
Meredith Park Pond	Pocahontas
Meyers Lake	Black Hawk
Mile Hill Lake	Mills
Mill Creek (Lake)	O'Brien
Minnewashta Lake	Dickinson
Mitchell	Black Hawk
Moorhead Park Pond	Ida
Mormon Trail Lake	Adair
Nelson Park Lake	Crawford
Newcom/Riggelman N.R.A. Pond	Crawford
Nine Eagles Lake	Decatur
North Twin Lake	Calhoun
Ocheyedan Pit #1	Osceola
Oldham Lake	Monona
Orient Lake	Adair
Otter Creek Lake	Tama
Otter Creek R.A. Pond	Sioux
Ottumwa Lagoon	Wapello
Percival Lake	Fremont
Petersons Pit, West	Story
Pierce Creek Pond	Page
Pleasant Creek Lake	Linn
Pollmiller Park Lake	Lee
Prairie Rose Lake	Shelby
Rathbun Reservoir	Appanoose
Red Haw Lake	Lucas
Rice Lake	Winnebago
Roberts Creek Lake	Marion

Lake Name	County Name
Little Wall Lake	Hamilton
Littlefield Lake	Audubon
Rock Creek Lake	Jasper
Rodgers Park Lake	Benton
Rudd Lake	Floyd
Sand Lake	Marshall
Scharnberg Pond	Clay
Silver Lake (Delaware)	Delaware
Silver Lake (Dickinson)	Dickinson
Silver Lake (Palo Alto)	Palo Alto
Silver Lake (Worth)	Worth
Slip Bluff Lake	Decatur
South Prairie Lake	Black Hawk
Split Rock Lake	Chickasaw
Spring Lake	Greene
Springbrook Lake	Guthrie
Storm Lake (incl Little Storm Lake)	Buena Vista
Sturchler Pit (Newell Pit)	Buena Vista
Swan Lake	Carroll
Thayer Lake	Union
Three Mile Lake	Union
Trumbull Lake	Clay
Tuttle Lake	Emmet
Twelve Mile Creek Lake	Union
Union Grove Lake	Tama
Upper Gar Lake	Dickinson
Upper Pine Lake	Hardin
Viking Lake	Montgomery
Volga Lake	Fayette
West Okoboji Lake	Dickinson
White Oak Conservation Area Lake	Mahaska
Williamson Pond	Lucas
Willow Creek	Osceola
Willow Lake	Harrison
Wilson Lake	Lee
Wilson Park Lake	Taylor
Windmill Lake	Taylor
Winterfield Pond (aka Van Zee Pit)	Sioux
Yellow Smoke Park Lake	Crawford

Appendix B - Potential Affected Facilities

State ID #	Facility	Watershed
9405001	Badger, City of	Badger Lake
3554001	Latimer-Coulter, City of	Beeds Lake
2900103	US Gypsum	Big Hollow Lake
1409002	Breda, City of	Black Hawk Lake
9427001	Duncombe, City of	Brushy Creek
9486001	Vincent, City of	Brushy Creek
862001	Pilot Mound, City of	Don Williams Lake
5200906	Macbride Sanitary District	Lake Macbride
5282001	Solon, City of	Lake Macbride
2783001	Van Wert, City of	Little River Lake
9334004	Corydon, City of	Rathbun Reservoir
5909001	Derby, City of	Rathbun Reservoir
9348001	Humeston, City of	Rathbun Reservoir
5900903	IDOT Maintenance Garage - Chariton	Rathbun Reservoir
5939001	Russell, City of	Rathbun Reservoir
6368301	Park Hills Utility Community	Roberts Creek Lake
3080001	Terril, City of	Trumbull Lake

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